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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,683	12/21/2001	Edwin Charles Weldon	AM-6180	2033

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APPLIED MATERIALS, INC.
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EXAMINER

MCDONALD, RODNEY GLENN

ART UNIT PAPER NUMBER

1753

DATE MAILED: 10/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/027,683

Applicant(s)

WELDON ET AL.

Examiner

Rodney G. McDonald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22,23,27-34 and 38-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22,23,27-34 and 38-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 7, 2004 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 22, 23 and 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Donnell et al. (U.S. Pat. 6,620,520) in view of Singh (U.S. Pat. 5,558,789).

Regarding Applicant's claim 22, O'Donnell et al. teach a corrosion resistant component for semiconductor processing equipment. (See Abstract) The component can be made from a ceramic (e.g. alumina). (Column 7 lines 27-32) One or more intermediate layers of material can be deposited on the surface of the component. (Column 7 lines 59-61) A first intermediate coating 80 is coated on the reactor component 70. The layer 80 can be roughened by any suitable technique and then overcoated with a second optional coating 90. (Column 8 lines 8-16) The first and second intermediate coatings may be made of one or more materials employed in conventional plasma processing chambers. Examples of such materials include metals, ceramics and polymers. Particularly desirable metals include refractory metals. (Column 8 lines 27-31) Before coating the component can undergo a surface preparation treatment utilizing techniques such as cleaning and grit or bead blasting to provide a more chemically and physically active surface for bonding. By grit blasting, the surface area available for bonding can be increased which can increase the coating bond strength. The rough surface profile can also promote mechanical keying or interlocking of the coating with the substrate. (Column 5 lines 1-12)

Regarding Applicant's claim 23, O'Donnell et al. teach that the reactor components can be made from ceramic materials such as alumina, silicon carbide, silicon nitride, boron carbide and/or boron nitride. (Column 7 lines 53-58)

Regarding Applicant's claim 27, O'Donnell et al. teach that the layer 90 can be a metal. (Column 8 lines 27-31) Metal includes Aluminum.

Regarding Applicant's claim 28, O'Donnell et al. teach that the layer 90 (i.e. the sacrificial layer) can have any suitable thickness such as a thickness of at least about 0.001 inches, preferably from about 0.001 to about 0.25 inches. (Column 8 lines 21-24) As to the range of thickness of the sacrificial layer, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected a known thickness in the prior art's range which is within the range of applicant's claims because it has been held to be obvious to select a value in a known range by optimization for the best results, see *In re Aller et al.*, 105 U.S.P.Q. 233.

Regarding Applicant's claim 29, O'Donnell et al. teach a layer 80 which can serve as the bond coat layer between the ceramic component and the sacrificial metal layer 90. (Column 63-65)

Regarding Applicant's claim 30, O'Donnell et al. teach that layer 80 can be made of metals, ceramics, and polymers. (Column 8 lines 29-30) This reads on a material with the required coefficient of thermal expansion.

Regarding Applicant's claim 31, the ceramic can be alumina (Column 7 line 56; Column 5 lines 50-51) and the bond coat layer 80 can be a metal such as a refractory metal. (Column 8 lines 29-31) Refractory metals cover tantalum.

Regarding Applicant's claim 32, the thickness of the layer 80 can be from at least about 0.001 inches, preferably from about 0.001 to 0.25 inches. (Column 8 lines 2-5) As to the overlapping range of thickness of the bond coat layer when compared to the

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present claims, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by O'Donnell et al. because overlapping ranges have been held to be a prima facie case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549.

The differences between O'Donnell et al. and the present claims are that the mechanical interlocks being undercut is not discussed, the coating 90 of O'Donnell et al. being a sacrificial coating is not discussed and the method of forming the mechanical undercuts is not discussed.

Regarding Applicant's requirement of claim 22 for the mechanical interlocks being undercut, the interlocking or keying feature is believed to suggest undercutting since to be keyed the layer must fit in a hole in the substrate like a "key" to a door to mate to make a strong bond. (Column 5 line 9)

The motivation for utilizing mechanical interlocks with undercuts is that it allows for increasing coating bond strength. (Column 5 lines 8-10)

Regarding the coating 90 being a sacrificial layer since the coating can be selected to be the same as Applicant's this coating 90 is believed to suggest the same requirement required by Applicant's product component.

Regarding the process limitations in the claim requiring various etching procedure Singh is relied upon to teach utilizing a laser to surface treat a substrate of metal, ceramic or composite material to produce micro-scale surface structures. (See Singh Abstract) The process limitations of the claims are given little weight since the

product could be produced by others methods such as blasting to produce the patterned etch.

The motivation for laser treating is that it allows for production of an adherent interface. (See abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified O'Donnell et al. by utilizing mechanical under cut interlock and a sacrificial coating as taught by O'Donnell et al. and to form the forming the mechanical undercuts by utilizing a laser as taught by Singh because it allows for increasing the bond coat strength and production of an adherent interface.

Claims 33, 34 and 38-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Donnell et al. in view of Singh as applied to claims 22, 23 and 27-32 above, and further in view of Hong et al. (U.S. Pat. 5,897,752).

The difference not yet discussed is the plasma chamber being a sputter plasma chamber with the component being a deposition ring.

Regarding the component being a deposition ring Hong et al. suggests a plasma chamber which is a physical vapor deposition for sputtering that includes a clamp ring formed of an insulating ceramic with a metallic film on its top surface. (See Abstract; Column 6 lines 40-44)

The motivation for utilizing a clamp ring comprised of a ceramic and a metal is that it allows for controlling the sputtering characteristics of the plasma including the energy and directionality of the sputtered particles. (Column 6 lines 44-49)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized as the plasma chamber a sputtering chamber and to have utilized as the chamber component a deposition ring as taught by Hong et al. because it allows for controlling the sputtering characteristics of the plasma including the energy and the directionality of the sputtered particles.

Response to Arguments

Applicant's arguments filed October 7, 2004 have been fully considered.

In response to the argument that O'Donnell et al. teaches a component that has a coating that is corrosion resistant and not a sacrificial coating as required by Applicant's claims, it is argued that O'Donnell et al. teach *a component product having the same layered structure* as required by Applicant's claims. O'Donnell et al. suggest a ceramic component with a first layer 80, a second layer 90 and a final corrosion resistant layer. Here second layer 90 could be a metal (i.e. aluminum), which reads on a sacrificial layer as required by Applicant because the required product layer of the component is the same as Applicant's. The first layer 80 could be a metal (i.e. a refractory metal which is tantalum serving as the bond coat layer or a sacrificial layer on the ceramic component which also reads on the sacrificial layer as required by Applicant), a ceramic (i.e. also provides ceramic surface for the component) or a polymer. The first layer 80 can be roughened by known means (i.e. grit or bead

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blasting) for mechanical keying to create a strong bond. Also the component can be roughened for subsequent coating layers. (See O'Donnell et al. discussed above)

It should be noted that Applicant's claims are open to including additional layers on top of layers 80 (i.e. ceramic surface with patterning from roughening or bond coat layer) and 90 (i.e. sacrificial layer) and in this instance O'Donnell et al.'s corrosion layer of zirconia toughened ceramic is believed to include the additional layers. Applicant's claims do not limit the outer surface to that of only a sacrificial layer.

In response to the argument that O'Donnell et al. does not teach a sacrificial coating that can be easily removed, it is argued that O'Donnell et al. suggest metals layer that can be deposited on a ceramic component and that these metal layers would read on Applicant's sacrificial layer because the layers are the same product layers required by Applicant.

In response to the argument that Singh does not teach utilizing an exposure mask or an optics system for producing a patterned beam which produces an undercut structure, it is argued that Singh do suggest utilizing a laser for patterning and that this laser could be used for thermal etching since the laser heats the substrates to etch the pattern. (See Singh discussed above)


The Examiner awaits response to the new positions presented in this Office Action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
October 20, 2004